THE MAC Flyer

JANUARY 1984

Operational Support Aircraft...16

THE MAC Flyer

For Greater Safety in MAC Air Operations

JANUARY 1984 MACRP 127-5 VOL. XXXI NO. 1

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A Subtle Reminder

Enter the 1984 MAC Flying Safety Writing Contest

All right you dirty rats, it's time to stop procrastinating and putting us off. That's right, I'm talking to you *and* your friends. First it was the old "Thanksgiving's Coming" excuse. Then the equally overused "But—I-Haven't-Even-Started-My-Christmas-Shopping" dodge. But now it's January, the income tax deadline doesn't come for three months and you're out of excuses!

Whad'ya mean—what am I talking about? Why it's the world famous 1984 MAC Flying Safety Writing Contest, of course. In case you hadn't noticed, the 1984 contest has been in full swing for two months already and the number of early entries can be counted on the toes of one small foot. C'mon now, I know there are *mobs* of you out there waiting for the last minute to write your prize-winning entries. So what's keeping ya? Remember, the contest closes on 31 March and my recently paroled associate is busily engraving plaques and desk sets for you winners. (Disregard any pictures of Washington, Lincoln or Jackson which might accidentally appear on the plates.)

Hey! I'll make it easy for you. If you'll send me an entry, be it a story or a poem, I'll send you your very own C.R. Terror T-shirt by return mail. (Trust me!) What's more, I'll also provide you with a free one-year's paid subscription to this esteemed publication. All this just for entering, sending your masterpiece to us and following the rules!

The only catch (and there's always one) is that your story or poem must contain an aviation safety or mishap prevention message. So dust off your typewriter, move that stack of unread PME/SKT/PFE books aside and put your story to paper. Then edit, edit again and mail it off to our eagerly awaiting and carefully screened panel of totally unbiased judges.

If you fail to heed this *friendly* advice, my pals Lefty and Knuckles will be forced to meet with you and make you an offer you can't refuse!

The Rules

The 1984 MAC Flying Safety Writing Contest is conducted according to MACR 900-3 and these rules. All entries must be original, unpublished and postmarked no later than 31 March 1984. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages); poetry should be about 75 to 100 lines. Entries must contain an *aviation safety/mishap prevention message.* Manuscripts must be double-space typed and submitted in *two copies.* Identify entries by title only and attach a cover sheet showing the author's name, address, duty phone number and unit. Also, the cover sheet should contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free C.R. Terror T-shirt (*so indicate your size*) and a free 1-year subscription to *The MAC Flyer.* However, contest prizes (desk sets and plaques) may only be awarded to military members and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a Special Category. All winning stories will be published in *The MAC Flyer.* Entries should be addressed to:

Safety Writing Contest
HQ MAC/IGFE
Scott AFB, IL 62225

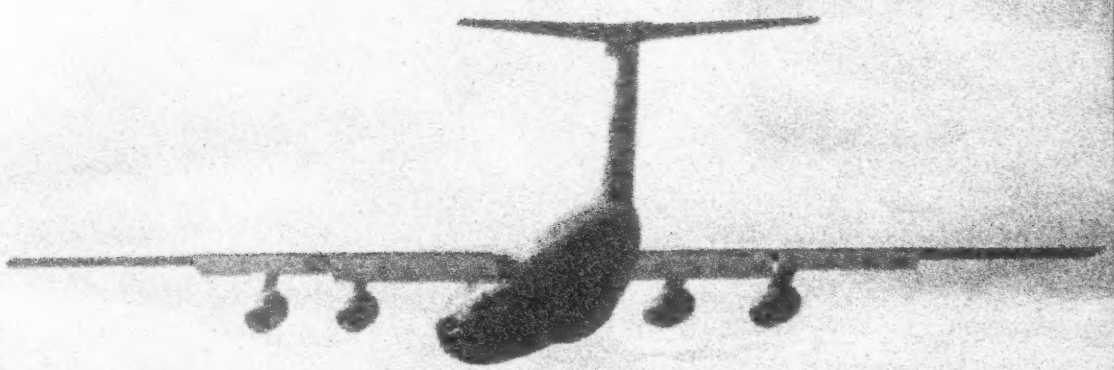
The Fixation

Will a Starlifter pilot learn in time?

by Maj. Bill Newmiller
4 MAS
McChord AFB, Washington

Its landing gear still down, the silver T-37 climbed slowly toward the Texas sun. Leveling off at pattern altitude and moving ever slower, its nose fell abruptly and the plane rushed toward the ground.

Major Jim Tanner still dreamed about the crash even though 10 years had passed.



Honorable Mention, 1983 MAC Flying Safety Writing Contest

Whether he was falling asleep at home or trying to doze in the loft of his C-141, those moments between wakefulness and sleep found him in a twilight world where he'd remained a first lieutenant imprisoned in the T-37 runway supervisory unit at Sheppard AFB watching his Vietnamese student stall, crash and die.

The imprisonment was guiltless for Nguyen had learned well. He was the "top stick" in his class and his checkride scores were higher than anyone's. Nevertheless, Nguyen *was the one* who forgot to raise his gear when he pulled up for an emergency closed pattern. Nguyen *was the one* who became so distracted when his air conditioner failed to full hot that he let his airspeed bleed off to V-stall. And Nguyen, who'd been graded excellent in stall recoveries, *was the one* who failed to ease forward on the stick, add full power and fly his plane out of the stall.

Jim Tanner lay in the loft trying to sleep. Through his ear plugs he heard the rushing of the air conditioning packs and felt the dry heat blanketing his tired body. After 2 more hours of rest he'd have to get up. The first pilot and copilot on his augmented crew could take care of things until they were an hour out of Diego. He closed his eyes, letting the noisy darkness dissolve, and once again the silver T-37 climbed slowly toward the Texas sun.

"Major, it's time to get up." The scanner pulled at his right foot. Still rubbing his eyes, he climbed into the right seat. 1st Lt. Bob Newton, the first pilot, would get this approach and landing.

As Bob flew the descent, Jim watched approvingly and handled the radios. "Diego Tower, MAC 60174 is 50 DME."

"Roger, MAC 174. Diego altimeter two-niner-niner-four. Winds 310° at 6 knots. Continue inbound, we have a Navy P-3 taking runway 30 for departure to the northwest. Should be no factor." The Starlifter continued its descent, leveling off at 2,500 feet, the approach check completed.

Then the tower called, "MAC 174, say position."

"Diego, MAC 174 is 10 miles east."

"MAC 174, the P-3 is experiencing some difficulty on the runway. Request you remain 10 east and we'll keep you advised."

"Roger, Diego. MAC 174 copies. We'll hold on the 100° radial between 10 and 20 DME at 2,500 feet. When do you expect the runway to be clear?"

Tower's response was slow. The C-141 had completed its outbound turn before Diego answered, "MAC 174, the P-3 crew tells us they should be clear in a few minutes."

On interphone now, Jim asked the engineer for fuel on board. "Twenty-three thousand," came the response. All was quiet as the crew reflected on the unlikely possibility of not being able to land at their remote island destination. Jim broke the silence on interphone, "Well, folks, this is why we carry 1 plus 15 holding fuel for an island, but I still don't like it."

The Starlifter reached 20 DME and turned inbound. Jim engaged the autopilot and turned on the altitude hold. Then the master caution light blinked on, the annunciator panel flashing "cargo smoke."

Now the tone on the interphone was anything but reflective. Jim started with the loadmaster, "We've got a cargo smoke light. Do you see anything?"

"Yes, sir," came the answer. "There's a bit of light smoke or something way in the back. I'm heading back to check."

Jim assumed control of the airplane and told the other pilots to run some fire bottles to the back of the cabin "just in case." Then sniffing the air, he began to notice a faint burning odor. "Crew, everyone on oxygen!"

Only Jim and the engineer remained up front as they ran through the Dash One procedures. Jim twisted the turn control knob and began turning back to the east. In the rear the rest of the crew dug into the aft most pallet following the smoke to its source. The deeper they dug, the more intense the smoke became. Jim turned in his seat and looked over his left shoulder through the open flight deck door as some thin wisps of smoke drifted past the galley to the flight deck. He noticed his airspeed was a bit high, so he pulled off some power. What he didn't notice was that the altitude hold disengaged. He also didn't hear the almost imperceptible click as the autopilot disconnected.

The loadmaster's voice came over the interphone. "Whatever is smoking in here seems to get worse when we bank. Maybe it's a liquid. Can we stay wings level for a while to keep it from sloshing?"

He didn't hear the click of the autopilot disconnecting.

Jim called Diego Tower. "MAC 174 is declaring an emergency. We've got a cargo fire. Pass this on to the fire department: the fire is in the last pallet position at the rear of the plane. We'll clear the runway and open the cargo doors so they can reach the fire. The aircrew will exit through the crew entrance door. That's the forward door on the left side. When can we have the runway?"

Slowly, the vertical velocity indicator nudged downward. "MAC 174," tower replied, "we copy your emergency. Be advised the P-3 needs to be towed clear of the runway. The tug is enroute. Say number of souls on board."

The C-141 continued its slow descent toward the Indian Ocean. Far away, the T-37 climbed slowly toward the Texas sun.

"Tower, we have seven on board—all crewmembers. How long before the runway will be clear?"

The forgotten autopilot remained off. In another place the forgotten gear handle stayed down.

Diego tower answered, "Fifteen minutes, sir, and the runway should be clear."

Lower, lower went the C-141, its pilots' eyes scanning the approach plate, rechecking the briefed numbers. Adrenaline had keyed Jim up. His mind was rushing now. He'd have to get Bob back in the seat soon. In another time Nguyen's voice couldn't keep up with his thoughts. His tongue wouldn't form the English words. All that could come out was "very hot." Lower, lower went the T-37's airspeed.

"Diego Tower, MAC 174 will continue outbound for another 5 minutes, then we're turning inbound to start our approach. Tell them to get that P-3 off the runway and have the fire truck standing by."

"Load," the pilot requested on interphone, "send Lieutenant Newton back up here. We're landing as soon as possible."

The summertime sun in Texas blazed as hot as the tropics, and Nguyen wanted only to leave its searing domain and land as soon as possible. Yet he would land sooner than he wished. The nose pitched down abruptly. The ground rotated to the left and jumped at the shuddering Tweet.

A slice of crimson illuminated the tropical horizon, and Jim Tanner froze in terror when he saw it high on his windshield. The foaming swells of the Indian Ocean licked at MAC 174 as Jim rammed the throttles forward and yanked back on the yoke.

Perspiration streamed down his forehead and dripped into his eyes. Suddenly, the heat had become insufferable. Involuntarily, his eyelids twitched tightly closed and then sprang open. He lay in the loft, his heart racing. Sitting up, he looked at his watch. "I guess," he said to himself, "it's about time to brief our approach."

About the Author

Maj. Bill Newmiller was commissioned in 1970 and received his pilot wings a year later at Columbus AFB, Miss. He served as a T-37 instructor pilot first at Columbus and then at Sheppard AFB. After receiving his master's degree from the University of Michigan in 1977, he joined the English department at the Air Force Academy. He is currently flying C-141s with the 4 MAS at McChord AFB, Wash.

Flying-Hour Milestones

CMSgt Charles M. Walton, 146 TAW
SMSgt Marvin G. Erickson, 313 MAS
MSgt Donald F. Elliott, 53 MAS

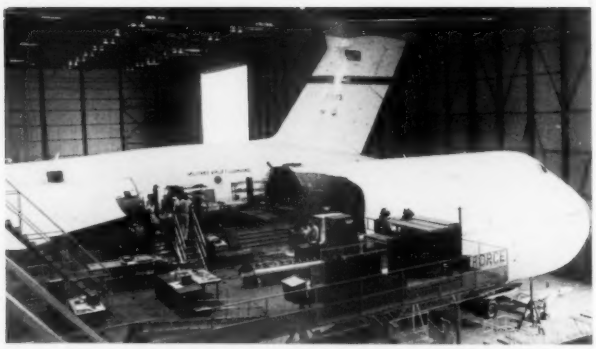
Lt Col Bert A. Lundell, 68 TAS
Lt Col Edward J. Petlak, Jr., 61 TAS
Maj James P. Czekanski, 910 TAG
Maj Kenneth R. Fischbach, 910 TAG
Maj John J. Freisinger, 1550 ATTW
Maj Alex H. Gay, III, 313 MAS
Maj Bruce Parker, 1550 ATTW
MSgt Robert C. Lober, 313 MAS
MSgt John R. Martindale, 313 MAS
MSgt Steven R. Randall, 97 MAS

Maj Stephen T. Sanger, Det 2, 37 ARRS
Maj Joseph A. Schmitz, 1 HS
Sq Leader Crawford J. Turner, 1550 ATTW
Maj William G. Vance, 1550 ATTW
Capt Scott J. Aston, 1 HS
Capt Terry A. Graybeal, 1550 ATTW
Capt Frank J. Pelz, 1 HS
Capt James J. Tanner, 1 HS
Capt Donald Wurster, 1550 ATTW
MSgt Robert A. Mefford, 1 HS
TSgt Pat R. Rowland, 1 HS
TSgt Jose A. Tavarez, 1 HS

Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award.

Pacer Wing: The C-5 Wing Mod

Restoring full mission capability for the Galaxy



A C-5A military transport (foreground) is being prepared to receive new wings.

Easy does it—this specially designed track/saw system is used to separate existing wing components in the first production phase of the C-5 wing mod program.

Production C-5A Wing Mod Redelivered Aircraft

Current as of 25 November 1983

USAF Tail #	Date Input	Delivery Date	Days Ahead
67-0173	1-28-82	2-24-83	+28
66-9306	4-20-82	4-07-83	+20
68-0211	6-07-82	5-23-83	+9
67-0174	7-28-82	6-08-83	+19
67-0170	9-07-82	7-07-83	+12
69-0002	10-4-82	7-29-83	+11
66-8304	11-1-82	8-29-83	+1
67-0168	12-13-82	9-13-83	+3
68-0215	1-17-83	10-6-83	+0
67-0167	2-7-83	10-25-83	+0
69-0922	3-4-83	11-11-83	+0

Full mission capability—that's what we've achieved with each of our C-5As modified with new wings at the Lockheed-Georgia Company factory (Air Force Plant 6) in Marietta, Georgia. Aircraft 69-0006, which arrived in Marietta on 6 June 1983, is the "rate" aircraft. With its scheduled return to MAC in February 1984, newly-winged C-5s will be delivered back to MAC at a rate of 1.5 planes per month. The last C-5 is scheduled for completion of wing mod in July 1987.

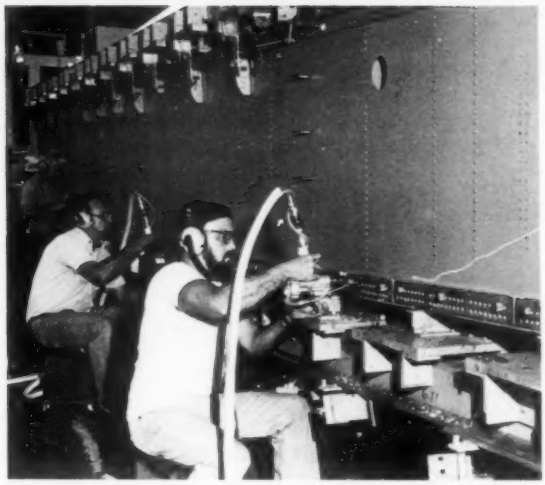
History

In July 1969, with the Galaxy already in production, cracks were discovered on a C-5 wing serving as the fatigue test article. Subsequent testing confirmed that the wing boxes would not achieve the design service-life goal of 30,000 hours. (In fact, there was a possibility of wing fatigue problems occurring as early as 7,100 representative mission profile hours.) Investigations by an Air Force independent review team, the Air Force Scientific Advisory Board and other organizations, led to the present C-5 wing mod program. The result is a $1.4 billion dollar, Headquarters USAF-directed, Class IV B mod to replace the wing boxes on the C-5A aircraft.

The Mod

During modification at Air Force Plant 6, each of MAC's 77 C-5As will receive new wings consisting of the center wing, two inner wing boxes, and two outer wing box sections. The existing engines, pylons, leading edges, trailing edges, and flight control surfaces are being removed from the old wings and reinstalled on the new wings. The new wing is manufactured from aluminum

by Capt. Gale E. Clouse, Jr.
Associate Editor



Lockheed-Georgia workers start in-plant assembly operations on the newly-designed C-5 wing. Photos by Lockheed-Georgia Co.

Air Force SMSgt. Bill Clampitt, flight engineer, checks fuel tank access panel prior to flight on rewinged Galaxy at Lockheed-Georgia Company.

alloys which were unavailable when the wing was first produced in the late 1960s and early 1970s. The increased thickness of the wing structural components adds approximately 18,000 pounds to the C-5 (less than 5 percent of the empty aircraft operating weight). In addition to the new wings, techniques and tooling for drilling and inspection of fastener holes on the wings were also upgraded.

Management

Despite some minor production variances, the C-5 wing mod is a success for both Air Force and contractor management teams. "The C-5 wing mod is ahead of schedule and under budget," according to Capt. Paul Anderson, the Air Force Plant Representative Office (AFPRO) program manager for the project. On-site Department of Defense management at the Lockheed-Georgia facility includes the AFPRO (Air Force Systems Command), a San Antonio Air Logistics Center (SA-ALC) resident technical team (Air Force Logistics Command) headed by Mr. W.M. Cromer, and a MAC liaison team. The production portion of the program is administered by the SA-ALC at Kelly AFB, Texas.

Lockheed's C-5 management team is led by Mr. C.P. Settlmeyer, director of C-5A programs. "We are very pleased with the C-5 wing mod program to date," remarked Mr. Settlmeyer. "Our C-5 wing mod manpower peaked this past May (2 months earlier than projected) at approximately 1,800 people. Through October 1983 we were about $11 million dollars under budget and had our C-5 wing mod program maximum of 12 planes in process. The first 11 modified planes were delivered to the Air Force cumulatively 106 days ahead of schedule. This translates directly into improved airframe availability for MAC."

Super Wing

In June 1978, Lockheed completed engineering and design for the new Galaxy wing. Shortly thereafter, the Aerostructures Division of the Avco Corporation, the wing subcontractor, manufactured two new sets of wings. Lockheed used one set as a new fatigue test article. The wing, officially known

Rewinged Galaxy lands at Scott AFB, Illinois. Photo by A1C Robert B. Baker, Det 1, 1361 AVS.

as fatigue test article X-991, underwent testing for 42 months at Air Force Plant 6. SA-ALC material management officials called the project the most demanding and sophisticated structural test program ever conducted on an aircraft wing. X-991 was tested to 105,000 cyclic test hours in 23,300 separate "flights" and has now been dismantled. Although test engineers subjected the wing to 100 percent of its design-limit load with induced flaws, it didn't break and no significant structural failures occurred. In the final 2 months of the program, engineers conducted damage-tolerance testing to gain knowledge of the wing's operational capability with induced "battle" damage.

The wing held up so well engineers are now calling it the "super wing." According to Mr. Ike Capelouto, manager of Lockheed-Georgia's structural testing division, "We did three-and-a-half lifetimes, plus a residual strength and two residual operating capability tests in 3.5 years. We know we have a good wing on the C-5A, and on the C-5B, which gets this wing also."

Lockheed installed the second set of new wings on 68-0214 as the prototype wing mod plane and that aircraft has accumulated over 2,400 flight hours since receiving the new wings. MAC input the first production aircraft on 28 January 1982 and this aircraft was delivered on 24 February 1983, 28 days ahead of schedule.

Installation

Avco, based in Nashville, Tennessee, is producing the wing panels and beams for two inner wing box assemblies, forward and aft boxes for the center wing, and the two completely assembled outer wing boxes. After manufacturing and quality inspections are complete, these parts are shipped via rail to Air Force Plant 06 in Marietta.

When a Galaxy scheduled for wing mod is received at Lockheed, it is defueled and purged. Then 20,000 pounds of ballast are placed on the plane to serve as a counterweight for the empennage when the wings are removed. Also at this time, components such as engines and pylons are removed.

The aircraft is then backed into the wing removal area where all other major usable components of the wing are removed and salvaged for use on the new wing. Finally the old wing is literally "sawed" off. Using a pneumatically driven circular saw, workers make two large cuts in the wing—one between the

inner and outer wing splice position; and one at the interface between the center and inner wing.

Wings removed, the Galaxy is towed to a center wing removal position where it is jacked and stabilized. After the center wing box is unbolted from the fuselage, it is lifted away. Here the old box is positioned on a fixture to establish alignment points for the new box.

Once proper center box alignment and installation of the new center wing are complete, the aircraft is moved to the wing mate (installation) dock where the electrical and hydraulic connections between the inner and outer wings are completed. Finally, the inner and outer wings are mated to the aircraft.

With new wings installed, the aircraft is prepared for a limited Air Force functional check flight (FCF) to check airworthiness and systems affected by the wing mod. Prior to flight, the rewinged aircraft undergoes extensive hydraulics, avionics and fuel system checks.

Functional Check Flight

An Air Force Systems Command aircrew consisting of two pilots, a nav, and two flight engineers performs the FCF. Air Force Capt. Alan King, a C-5 flight test pilot at Lockheed, related, "We perform a limited FCF (not the whole Dash Six) and check primarily the systems that were disturbed during the wing mod." The FCF, which averages 3-4 hours, checks flight controls, landing gear, stall limiter, engines, and the ram air turbine. The C-5 automatic lift distribution control system (ALDCS), which has been reprogrammed for the characteristics of the new wings, is also checked for normal operations. "Only two Air Force reflights have been required following FCF," according to Captain King. "It's amazing that for such a major structural modification, we've had so few problems." After the flight, the modified aircraft gets a post flight fuel soak to prove the integrity of wing fuel tanks. Following a trip to the wash rack, the plane is readied for a delivery flight back to Dover AFB, Delaware, Travis AFB, California, or Altus AFB, Oklahoma.

Program Success

The C-5 wing mod has restored the full capabilities of the Air Force's largest transport. The previous operating restrictions which limited C-5 cargo weights have now been lifted for the 11 Galaxys equipped with new wings. As a result, these 11 newly-winged C-5s can routinely and safely carry peacetime loads of up to 197,500 pounds of cargo.

By mid-1987, each of MAC's remaining C-5As will have completed the wing modification program. Col. William H. Sistrunk, commander of MAC's 436th Military Airlift Wing at Dover AFB, stated, "The men and women who daily manage the C-5 aircraft look forward to the day when we will once again have an unrestricted C-5 airlift fleet." With planes continuing to be modified ahead of schedule and under budget, that day isn't too far off. The new C-5 "super wings" are now ready for a full 30,000 hours of service life, which is equivalent to 30 years of additional flying at peacetime flying rates. Following the completion of the wing mod, the Galaxy, as the world's largest airplane, will proudly fulfill its role of outsize and heavy airlift well into the 21st century.

WHO HAS CONTROL?

A personal view of aircrew error

by Capt R. S. Elwell, RAF

The question "Who has control?" may be asked of the confused captain and his copilot, or of the indignant instructor and his pupil. It may even be asked of a puzzled solo pilot. This question doesn't ask whose hands and feet are actually on the controls; instead it asks who is making the decisions. Are they being made by the conscientious graduate of a flying school, or might the cockpit be occupied by an additional crewmember, one not listed on the manifest?

The nature of decision-making is being increasingly questioned in the context of military flying mishaps. Approximately 60 percent of accidents are attributed to aircrew error, and this figure remains more or less constant despite inducements, blandishments, punishments, and yet more checkrides. Of more interest, the aircrew attribution rate is about 60 per cent for *all* accidents, be they civil or military. This more or less constant proportion of the accident totals suggests an inherent prejudice against accident investigators. Alternatively, there may be a more subtle vulnerability in the most critical parts of the aircraft control system: the crew.

The conscientious pilot reads his Dash One and flying manuals and can quote regulations at length. He or she knows what a pilot can do, should do, must do. Although it's usually only after

a mishap that something is found at fault with the crew orders, on many more flights they are incomplete. They don't list everyone on board.

It's only speculation, but on some sorties shortly after takeoff, the pilot apparently hands over control to a demon. These demons aren't qualified pilots and know nothing about aircraft limitations, endurance, or weather minima. Most squadrons have a couple of demons, but being insubstantial, they don't appear on the squadron rolls. More to the point, neither can they be seen in the wreckage of the accidents they cause.

The existence of demons has yet to be conclusively demonstrated. They don't have a "cause code" in the statistics. However, some explanation is needed for why expensively trained and highly motivated pilots proceed to break regulations, their aircraft, and themselves.

Traditional psychological investigations into the role of the pilot have been directed towards the pilot as a "black box." He or she is part of a system and, for example, the rate at which this system can detect, select, and act upon information is subject to detailed numerical experimentation. Programming the black box, i.e., training, has been an area of investigation from the days before computers. The most important requirement was to teach new pilots what information to process and what decisions to make with it. With the assistance of physiologists and biotechnologists, the black box is installed in airframes. Whereupon operators complain because the time between overhauls (crew duty time) isn't long enough. This is the mechanistic approach, only slightly alleviated by current attention paid to stress. Most research on stress experienced by aircrews is devoted to noise, vibration and other physical events. It's conceded that personal circumstances can have an effect on people, so the pilot is exhorted to keep his problems out of the cockpit.

Despite this, the black box continues to be responsible for 60 percent of aircraft accidents. The mechanistic psychologists may not be studying the right part of the problem. They are assuming that given the necessary information, presented in optimum fashion to the selected and trained pilot, the right decision will be made. It may be that the level of psychological investigation is too shallow.

Sixty percent of accidents are attributed to aircrew error.

As an example, consider a low-level high speed flight into deteriorating weather. The cues that must be presented, and the pilot's responses that must follow, can be identified. We can describe elements of the visual field and the kinaesthethic cues that are needed. We can measure attention paid to a map, all of which results in a decision to roll right and climb through one pass and not another. What can't be evaluated is to what extent past experience and training alters the process. What is unclear is why the pilot elects to continue this profile which is becoming increasingly hazardous.

Circumstances are not a good explanation. It must not be forgotten that while techniques are normally prescriptive (i.e., they encourage doing), official rules tend to be prohibitive in nature. They forbid actions or limit activities. However, it is hardly practical to command courage, initiative and diligence; these are what leadership is needed for, and what customs support.

There is nothing surprising in the

From a reprimand to death —the consequences of rule-breaking.

basic psychological teaching that if you reward someone for doing something, they will tend to do it again. If you penalize or punish them, they are less likely to do it again. Thus, if pilots break the rules, the questions are how are they rewarded and why aren't they punished.

A hypothetical case might concern low-level flying authorized to be conducted down to 300 feet AGL. It's not hypothetical that some pilots fly lower than that; some pilots have bumped into things lower than that. Apart from radar altimeters, or the lack of them, the reasons and rewards for low flying may be:

- A pervasive belief that ultra-low-level flight (below 300 feet) will be needed in war.
- A confidence in self as a "professional" military pilot.
- A desire to demonstrate this professionalism (which is not inconsistent with rule breaking).
- The esteem and admiration of colleagues, and their tacit encouragement.

In opposition to these rewards are supervisors (who may well be in sympathy with their pilots) who are reluctant to censure their more able pilots (who will set an example) and who are unable to physically supervise every flight.

Even more critically, the ultimate punishment for flying too low occurs rarely, so those who witness or survive a crash actually rate it very low down on their list of potential hazards. There are sufficient hazards at 300 feet and above anyway.

One of the demons could be called "expectation." The expectations of friends and colleagues.

Another demon is called "experience." Consider crews whose attitude towards bad weather is that they won't plan to fly in it...but if caught out, they managed before, they can manage now. Similarly, in a real contingency, helicopters were overloaded "for operational reasons."

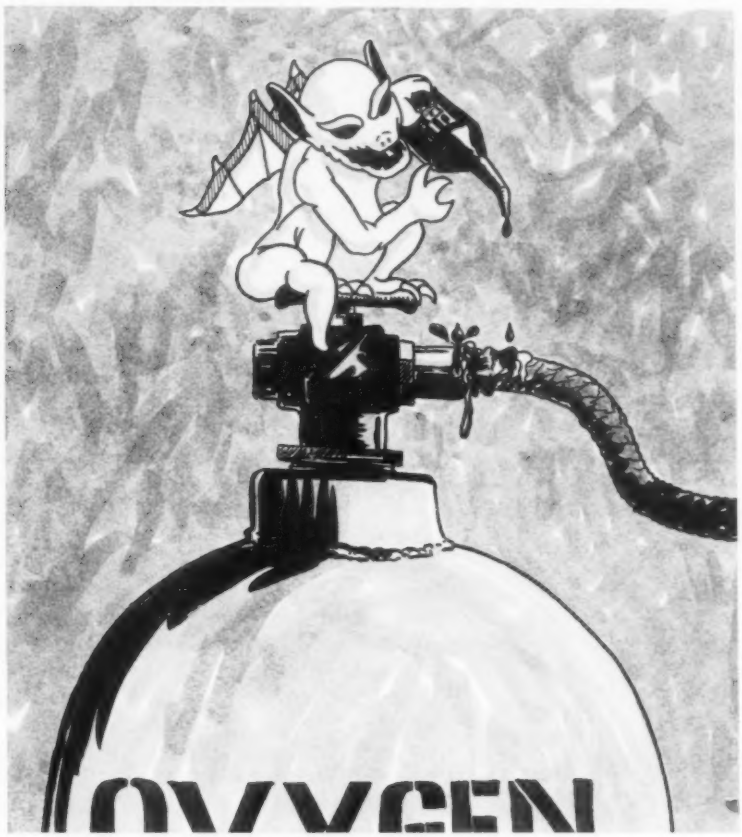
These demons are the result of an informal learning process. A pilot who flies to win is valued by his friends. He gets good reports. On his next sortie he'll fly to win again. The pilot who buzzes his home, or practices unauthorized acrobatics, or breaks any of a multitude of regulations will normally be undetected. He'll return safely. He is learning, although it's unlikely he'll be aware of it, that he can break the rules and succeed. The adverse consequences of rule-breaking may vary from a reprimand to death, but the chances of being detected are low, and as the pilot will declare, "If I thought I was going to crash, I wouldn't do it!"

Research into risk-taking behavior has found that when the probability of an adverse outcome is low (but if it did occur it would be catastrophic) the risk-takers ignore the bad possibilities. Even when the positive outcomes aren't very rewarding, they seem to understand only these. It's a manifestation of the "It-can't-happen-to-me" syndrome. But its particular importance is showing how difficult it is to make people really understand the possible consequences of their acts.

Finally, a military pilot must not merely possess an adventurous spirit like any aviator, he must be positively prepared to take risks. He bets his skill against an enemy's cunning and declared intention to kill him. It's been suggested that aggression is therefore a necessary quality in a military pilot and that this is responsible for recurring accidents which feature rule-breaking. It ignores the fact that civilian pilots are responsible for a similar proportion of civil accidents. It was this which led us to suppose that the pilot as a black box was inadequate. Every pilot flies with demons. Psychologists should shoot them down.

—RAF *Air Clues*

AWTH's Corner



Fire Hazard?

When a petroleum-based product is exposed to 100 percent oxygen the result can be spontaneous combustion—and fire! When these elements combine in an aircraft, the results can be catastrophic!

A C-141 crewmember was preflighting the interior of his aircraft when he noticed hydraulic fluid dripping down the left side of the cargo compartment. A quick check of the aircraft forms revealed a number 3 hydraulic system line had burst, but that the line had been replaced. A simple cleanup? Possibly. But the problem quickly became more complicated.

A closer inspection revealed the flammable red fluid had dripped into the connection fittings for the troop oxygen masks. After reviewing the aircrew publications for guidance (there was none), the AC elected to continue with the mission which proceeded uneventfully.

What really concerned this AWTH submitter, though, was what *could* have happened in the event of a rapid decompression. In that case, oxygen would automatically have been delivered through the system to the contaminated oxygen connector fittings. The potential for a flash, oxygen-fed fire seems obvious.

In order to correct this hazard, the submitter did two things. First, he took the time to fill out a MAC Form 325, the AWTH form. Secondly, he submitted an AF Form 847, recommendation for change of a publication. Why an 847? Well, it seems that some maintenance tech orders contain warnings concerning the use of oxygen equipment with fittings contaminated by oil, grease or hydraulic fluid. Unfortunately, this information is not currently available in aircrew tech orders, a situation which will be rectified.

Editor's Note—When the AWTH monitor at HQ MAC Flight Safety receives an AWTH submission that requires headquarters-level attention, it is forwarded to the appropriate HQ MAC directorate immediately. But the AWTH folks can't help you if you don't take the time to fill out the AWTH forms. If you see an Accident Waiting To Happen, report it. *Now!*

Operational Support Aircraft

New aircraft to replace an aging CT-39 fleet

by Capt. Gale E. Clouse, Jr.
Associate Editor

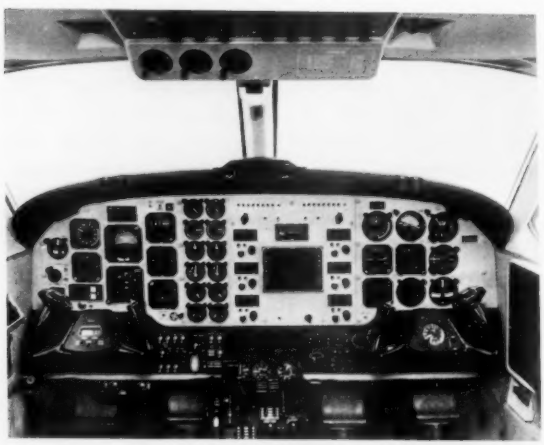
Beechcraft C-12F

C-21A in flight

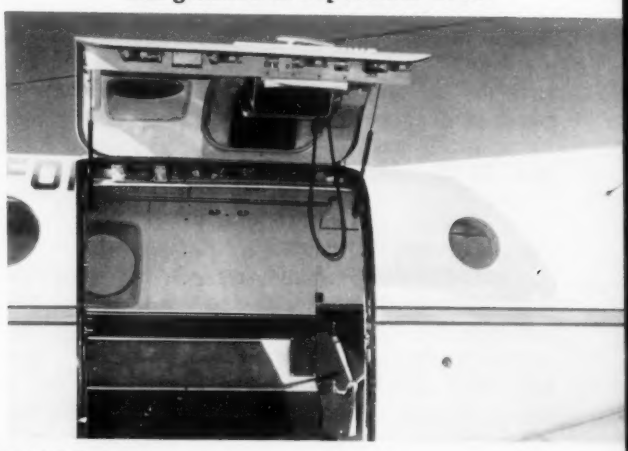
Old airplanes never die, they're just retired to the boneyard." For MAC's CT-39 fleet, the time for retirement has come. In fact, a replacement program underway will give MAC two new operational support aircraft (OSA). These aircraft are the Learjet Model 35A (Air Force designation C-21A) and the Beechcraft Super King Air B200C (Air Force C-12F). According to Maj. Bob Chambers, MAC OSA project manager, "This program has received high level attention and we've been moving on a fast track to get the new airplanes on the ramp as soon as possible. First deliveries of the C-21A are scheduled for March 1984 with C-12Fs due to arrive in May 1984. Both OSA aircraft will be based initially at Scott AFB, Illinois."

Acquisition

The Air Staff issued program management direction for the competitive lease in September 1982. The Aeronautical Systems Division (ASD) at Wright-Patterson AFB, Ohio, released the request for proposals to the contractors in March 1983 and contract award was granted in September 1983.



C-12F Cockpit Arrangement



C-12F Cargo Door

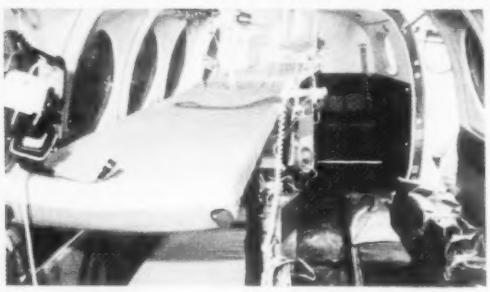
"The Air Force is planning to lease 80 C-21As and 40 C-12Fs for a minimum of 5 years," stated Lt. Col. Ben Huneycutt, ASD OSA program manager. The cost for leasing these new aircraft will be paid for out of current CT-39 funds for operations and maintenance, modification and depot-level repair. Under the contract, which is managed by ASD's Deputy for Airlift and Trainer Systems, MAC may extend its lease for another 3 years or buy the airplanes in 5 or 8 years. And once the new Sabreliner replacement aircraft start arriving, present plans call for MAC's CT-39s to be retired to the Military Aircraft Storage and Disposition Center at Davis-Monthan AFB, Arizona.

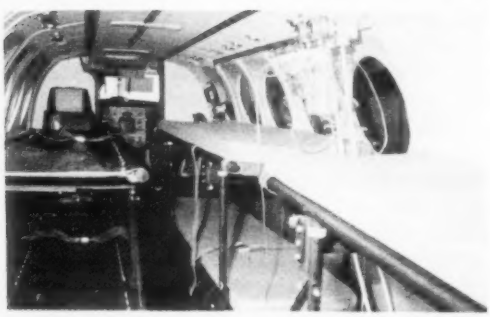
MAC will acquire OSA aircraft at a minimum rate of four C-21As and four C-12Fs per month. These new aircraft will provide time and mission-sensitive transportation of personnel and cargo during peace and war in an annual flying hour program of approximately 80,000 hours. Other specialized OSA missions include medical evacuation and deployment to overseas theaters on long range ferry flights. It will also have the added benefit of giving new Air Force pilots low-cost flying experience prior to moving them into major weapons systems.

The C-21A

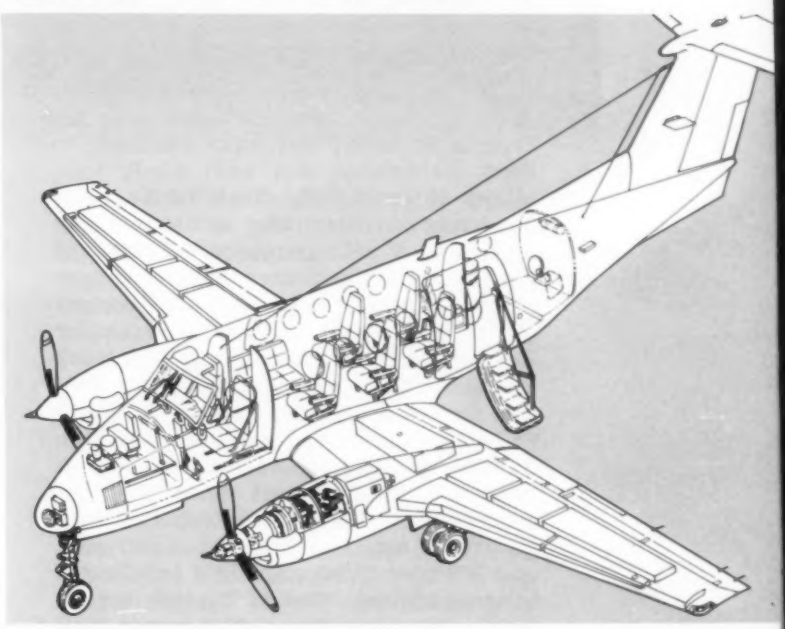
Gates Learjet Corporation is producing the C-21A at its Wichita, Kansas, manufacturing site with final painting, interior furbishment, avionics installation and flight testing at its Tuscon, Arizona, facilities. The new C-21A is among the most versatile business jets flying today.

The C-21A is equipped with two Garrett AiResearch TFE731 turbofans, the latest in fan-jet technology. They're capable of 3,500 pounds of thrust per engine at takeoff. The C-21A has a very high fuel efficiency per mile flown with a stingy 3 miles per gallon fuel consumption at altitude. With a fuel capacity of 931 gallons, the C-21A has a six-passenger maximum range of approximately 2,100 nautical miles with 45 minutes reserve fuel. High speed cruise for the Learjet 35 is .81 MACH/460 knots TAS at 41,000 feet. The landing distance at maximum landing weight on a level, dry, hard surface runway with no wind is 3,075 feet. The C-21A's performance



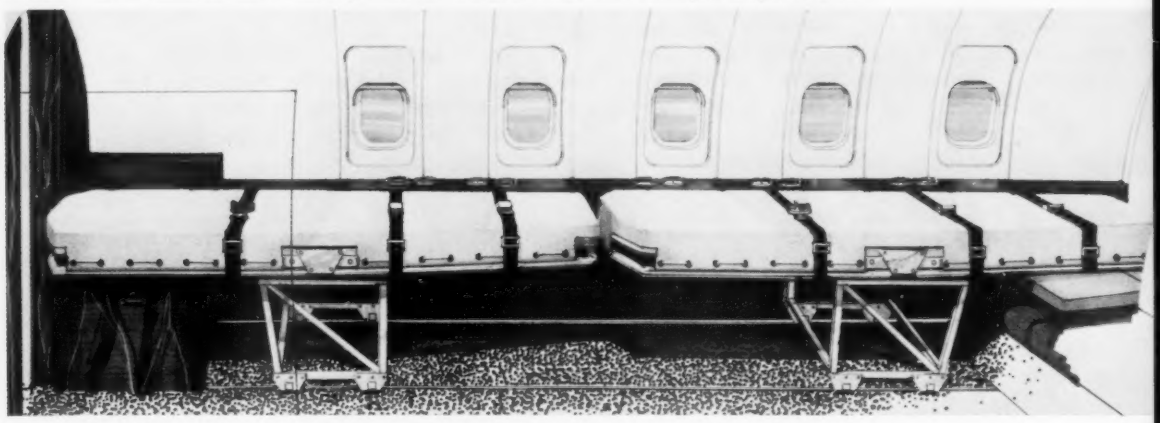


C-12F Aeromedical Configurations



C-12F schematic drawing

C-21A Learjet Model 35A Interior Configurations
Photos and illustrations courtesy Beech Aircraft and Gates Learjet Corporations.



allows it to rapidly climb above most inclement weather and cruise at high altitudes. It will operate with a crew of two pilots and will carry six/seven passengers comfortably. The passenger cabin, 50 percent roomier than earlier Learjet models, has reclining and track swivel seats, writing tables, and a console for hot or cold beverage service.

With a design proven over more than 3 million flight hours, the C-21A is certified under Federal Aviation Regulation (FAR) Part 25—Transport Category with approval for day, night, VFR and IFR operations and flight into known icing conditions. One of the quietest biz jets in the world, the C-21A meets FAR Part 36 noise level requirements.

The C-12F

The Beech Aircraft Corporation will produce the C-12F at its Wichita, Kansas, facilities. Its forerunner, the Super King Air C-12A, has been in the Air Force inventory since 1974. The C-12A, used almost exclusively overseas, is easily recognized by its distinctive T-tail which gives it superior handling qualities. The new C-12F, a derivative of the C-12A, will use Pratt & Whitney PT6A-42 turboprop engines rated at 850 SHP. With an inflight shutdown rate of 1 per 100,000 hours, the PT-6A is a highly reliable powerplant. The Super King Air has a structural design service life of 30,000 hours.

The C-12F can handle a variety of

missions and is certified under FAR Part 23—Transport Category. Its shortfield capability makes it especially useful for airlift movement and humanitarian missions overseas. When equipped for aeromedical evacuation, the C-12F can carry two litter patients with medical attendants.

With a maximum fuel capacity of 544 gallons, the C-12F's maximum range is more than 2,000 miles with a ferry range of over 2,900 miles. Able to cruise at a maximum speed of 292 knots TAS, the Super King Air also has a certificated ceiling of 35,000 feet. Its maximum payload excluding crew is over 2,300 pounds. The C-12F will have a large cargo door and can carry eight passengers.

OSA Avionics/Instrumentation

Both OSA aircraft have common avionics equipment with dual VHF transceivers, a UHF transceiver and an HF transceiver. For navigation they will have dual VOR/ILS/GS receivers, TACAN, VLF-Omega long range navigation equipment and an ADF/LF beacon receiver. Also included are color weather radar, radar altimeters with altitude pre-select, true airspeed readout, and IFF with Mode IV capabilities. Both cockpits will have dual flight directors with separate air data computers and standby attitude indicators. In addition, the C-21A will have electronic horizontal situation indicators displayed on cathode ray tubes (CRTs) for both the pilot and copilot. The C-21A will also have a sophisticated navigation system that automatically tunes and identifies navigation aids that are pre-programmed in its memory.

Logistics

Both contractors, Gates Learjet and Beech, will provide flight line, intermediate and depot total logistics and maintenance support. Beech Aerospace Services, Inc., currently has support available at 101 locations in 34 countries and now supports all C-12s in the Air Force, Army, Navy and Marine inventories. Gates Learjet presently operates 14 U.S. and 12 overseas service centers and will establish an additional 15 locations to help support and maintain the leased C-21As as MAC begins receiving the new airlifters.

Training

OSA initial ground simulator and flight training will take place at each contractor facility. Gates Learjet will train 240 MAC C-21A pilots (three per aircraft) beginning in February 1984. FlightSafety International will provide ground school, including simulator time. The Gates Learjet flight operations department, also in Tuscon, will conduct all flight training. The 4-week program "consists of 40 hours of academics, 20 hours of simulator time and 7.5 hours of first pilot flying time," according to Maj. Glen Haden, MAC OSA training program manager. Upon completion of flight training, each pilot will receive a MAC flight evaluation. Selected MAC instructor pilots will get follow-on training in Tuscon consisting of an additional 16 hours of academics, 8 hours of simulator time and 6 hours of flight time.

The 3-week Beech program will train 120 pilots (again, three per aircraft). During this training at Wichita, Kansas, each MAC pilot will receive 35 hours of classroom lectures, computerized individual learning station training and cockpit procedures training. Also, 10 hours of simulator time and 4.5 hours of first pilot flight time are planned for each pilot. Selected C-12F instructor pilots will receive an additional two simulator flights and approximately 4 hours of flight time. Upon completion of Beech training, MAC pilots will receive further training at the 375th AAW Central Training Facility at Scott AFB.

Conclusion

MAC's new fleet of 80 C-21As and 40 C-12Fs will give it new and greater capabilities for its administrative airlift mission. Equipped with state of the art avionics and engineered for safety and durability, MAC's leased, modern operational support aircraft should provide efficient airlift service in the years ahead.

Ducking Under

Pitfalls of landing from precision approaches

A few years ago, 11 of Boeing's most experienced instructor pilots crashed in the same day. Though the average flight time logged by these experienced captains was over 10,000 hours, each landed short of the runway. Nobody was hurt though, because the crashes took place in a simulator. Actually the pilots were part of an experiment conducted to determine the reason four perfectly good Boeing 747s had crashed in rapid succession during landing at Tokyo, Cincinnati, Salt Lake City, and Chicago. For the experiment, researchers built a model of a lighted city, visible from the simulator windows. Each pilot was then instructed to perform a visual approach using all available instruments *except* the altimeter.

In effect, this experiment simulated what happens when the pilot leaves the instruments and "goes visual" for landing. It's a good thing it was just a simulation because 11 of the 12 pilots in the simulator experiment landed short. (One made it safely. He was a former Navy carrier pilot.) Each pilot was somewhat upset by his less-than-spectacular performance because this should have been the proverbial "piece of cake" maneuver. It wasn't. Why would 11 highly experienced pilots duck under the proper glide path and land short? The study concluded that perhaps there was more to the duck-under problem than simple pilot error. The pilots in the experiment were actually being asked to solve a problem which exceeded normal visual ability.

Given the proper set of circumstances, any pilot will duck under, regardless of

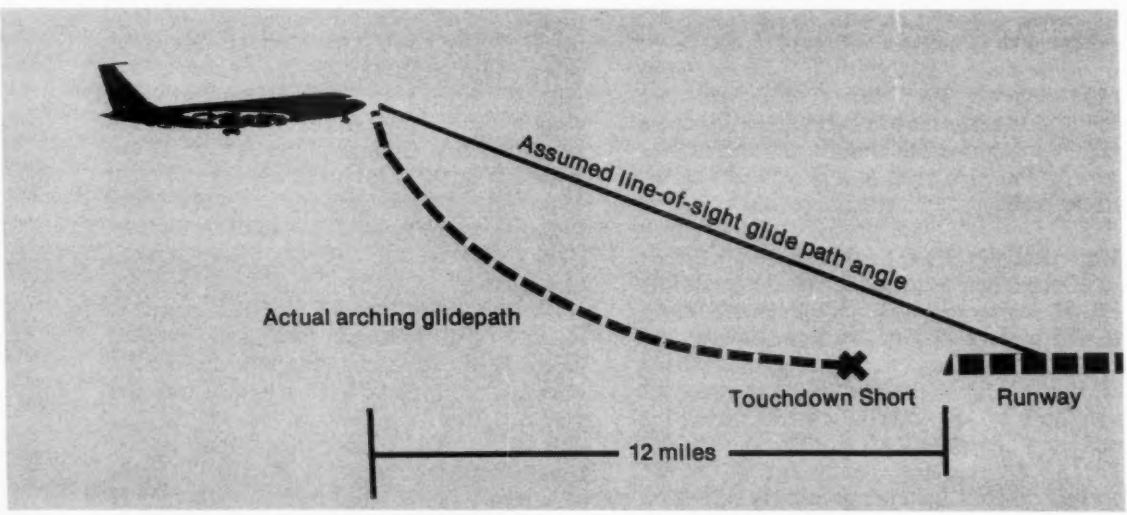


Figure 1. Assumed approach path from 12 miles out.

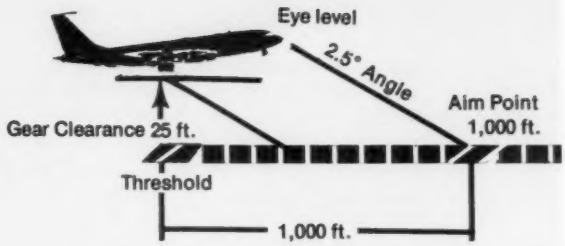


Figure 2. Approach path with normal 2.5° approach angle and 1,000 foot target visual aim point.

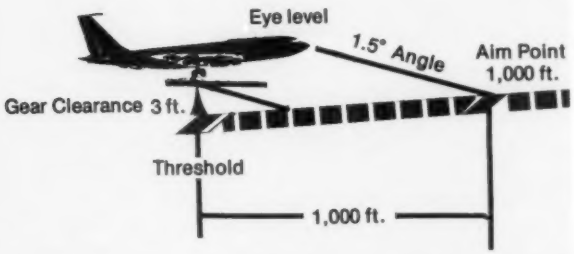


Figure 3. Approach path with 1.5° approach angle and 1,000 foot target visual aim point.

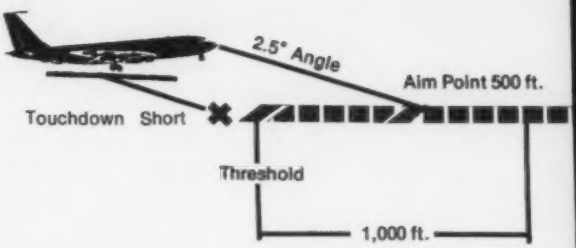


Figure 4. Approach path with 2.5° approach angle and 500 foot visual aim point.

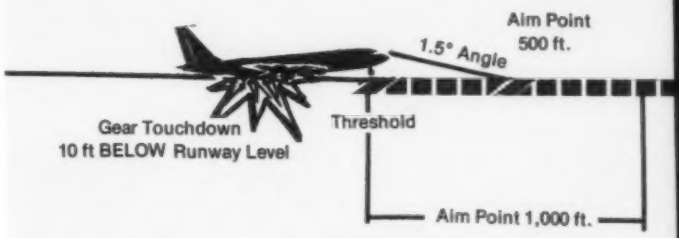


Figure 5. Approach path with 1.5° approach angle and 500 foot visual aim point.

experience level or eyesight. Usually the pilot believes that a perfect glide path is being maintained. Why don't pilots recognize a duck-under? To find out, let's discuss some visual phenomena which serve to deceive even the most proficient pilot. Assume we are shooting a straight-in approach from approximately 12 miles.

Though the line of sight is a straight line, it's possible for the actual flight path of the aircraft to follow the arc of a circle whose circumference hits the ground short of the airport. As the aircraft arcs below the glide path, the pilot shifts his or her aim point up in the windshield and maintains line-of-sight with the touchdown target. The pilot assumes that a precise glide path is being flown, yet the aircraft is actually arcing toward a touchdown point short of the runway.

Our eyes are especially deceived at night, but a number of other factors can also contribute to a duck-under. Beware of approaches over dark water, or land where there are no lights below or to the side of aircraft. It is impossible to visually judge your height above the terrain. Sloping or irregular terrain surrounding the airport, or extremely wide or narrow runways also present sensory illusions. Subconsciously, you adjust the glide path to produce the visual approach picture you're used to seeing (i.e., the "homedrome" syndrome).

When smoke, fog, haze or an obscuring factor reduces the brightness of the light below, it can create an illusion that the airplane is too high. This can cause you to prematurely lower the glide path angle or visually change your aim point. There are many circumstances which can create visual illusion and cause you to duck under, but let's discuss what happens to the airplane when the pilot ducks under.

Consider a C-135 flying a normal 2.5°

glide path. Remember the main landing gear is about 65 feet behind and 14 feet below the pilot. If the pilot maintains a 2.5° glide path, the main landing gear will cross the runway threshold at approximately 25 feet above the runway, assuming no flare. Using the standard 1,000 foot aim point, there is surprisingly little room for error.

Next, let's suppose there is a smoke, dust or fog layer which is lying low across the touchdown zone of the runway. The pilot maintains the 2.5° glide path, but changes the visual aim point from 1,000 feet down the runway to only 500 feet from the approach end. The airplane will touch down short of the runway.

Now let's add an illusion and consider the possible effects. Suppose the pilot shoots an approach to a runway with a 1° upslope. Believing that the airplane is too high, the pilot unintentionally ducks under and changes the glide path to a flatter 1.5°. At this shallow dragged-in approach angle, the landing gear will cross the threshold at approximately 3 feet .

Finally, let's discuss the most dangerous case. Suppose a pilot is shooting a night precision approach in the rain. Let's assume he or she disregards the instruments at minimums and ducks under to get below a ragged ceiling. Let's further assume that the pilot also changes the visual aiming point closer to the end of the runway in a misguided attempt to provide additional stopping distance. The pilot has committed two sins. The first was changing the glide path to 1.5° and the second was changing the aim point to 500 feet. In this case, the landing gear will try to touch down 10 feet *below* the threshold.

If you are on course and glide path when you break out at minimums, don't radically change anything. Yanking power off and diving at the runway in order to establish what you think is a "normal" approach creates a high sink rate close to the ground. This is hazardous both to your health and to the health of your passengers. If you level off from a duck-under using just elevator, you will quickly find yourself in a poor thrust/lift relationship.

At approach speeds, a small increase in angle of attack causes a relatively large increase in drag, thus requiring more than normal thrust. If the throttle setting is too low, there may not be enough engine spool-up time to stop the sink rate. The flatter the approach angle, the more difficult it is to visualize defects in any rate of change. Therefore, the pilot flying a dragged-in approach may not realize his aircraft's sink rate is greater than his means to stop it. If you add a sudden wind shear, the situation quickly becomes hopeless.

How do we prevent duck-under maneuvers? First, admit to yourself that your eyes can lie to you, and that your "normal" approach may not be normal at all. There are just too many visual illusions out there waiting to deceive you.

Secondly, don't give up vertical guidance (i,e., ILS glide slopes, PAR glide slope or VASIs). Have your copilot crosscheck the glide slope and the radar altimeter while you are visual. Once you go full scale below the glide path or red over red on the VASIs, it's impossible to tell exactly how far below the proper glide path you really are. In this case, a go-around is a *very* prudent option to consider.

Remember that the performance of your aircraft at any one instant on an approach is determined by what you did a few moments before. If your approach is stable and you're on glide path and are maintaining charted airspeed with the airplane trimmed properly, nothing drastic should happen when you look outside at minimums. At some airports, the PAR glide path and the VASI glide path may not agree, so don't let this tempt you into ducking under. Again, if you're fighting to stabilize the approach, take it around.

The last 200 to 300 feet of any approach demands the utmost in professional discipline and crew coordination. The safest appproach, considering the stopping distance and landing gear clearance over the threshold, is along a normal 2.5° to 3° approach path using a visual touchdown point 1,000 feet down the runway. The possible consequences of ducking under below those parameters can be devastating.

The next time you find yourself well below the glide path, or you see red over red on the VASI, remember what happened to the highly experienced Boeing IPs. They crashed the simulator. You may not be so lucky.

—Flight Safety Focus

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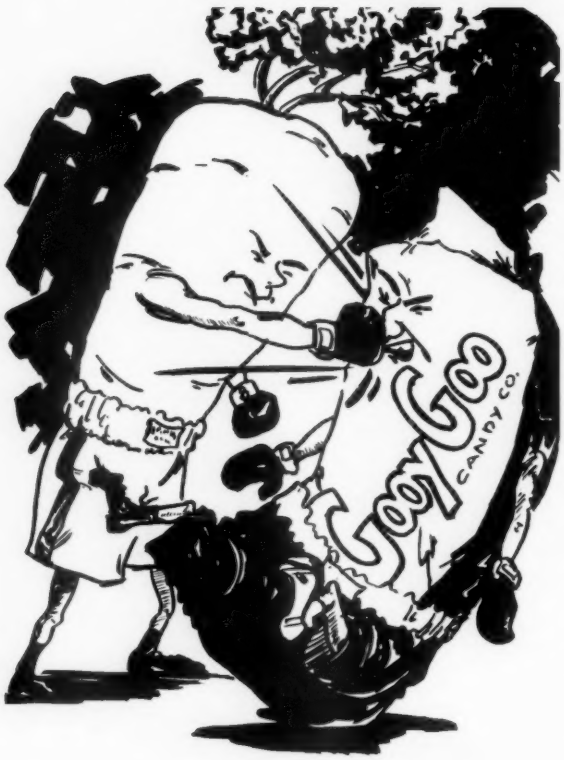
Dear Doc

by Col. Rich Pilmer
HQ ARRS/SG
Scott AFB, Illinois

Carrot Strips



It's dark, you're tired and now you're hungry. You *know* you need to eat—got to get that blood sugar level up. But what do you reach for? That luscious, chocolate-covered, marshmallow cream-filled candy bar, or that boring looking bag of carrot strips?

Well, if you're a well-read MAC crewmember and knowledgeable in medical/nutritional matters, you'll quickly reach for the carrots. I know, I know! That candy bar is much more satisfying. But research has shown that the carrot strips will raise your blood sugar level much quicker than that mega-calorie chocolate diet buster.

According to Dr. David J.A. Jenkins, now of the University of Toronto, and his co-workers at Oxford University and Central Middlesex Hospital in London, carrots are more effective in raising blood sugar levels than a number of other so-called quick energy foods. These include honey, a chocolate bar, raisins, potato chips, pastry, cornflakes and even ice cream. In fact, their research showed only one food surpassed carrots in its ability to rapidly increase blood sugar levels—the little known parsnip. Besides the blood sugar benefits, there are other good reasons to munch on carrots.

As older rabbits and flight surgeons have long known, carrots are rich in vitamin A. This is important to aircrews (and rabbits) because the quantity of vitamin A in the blood directly affects your night vision. Too little vitamin A causes the infamous night blindness. But don't run off to the health food store for a box of those vitamin A tablets. According to the experts, a normal balanced diet supplies all the vitamin A needed for you to "see in the dark." In addition to carrots, important sources of vitamin A include: squash, sweet potatoes, pumpkins, apricots, peaches, liver (Yuk!), egg yolks, whole grain cereals and spinach. Munching on a few carrot sticks inflight will just ensure that your diet stays in balance. As in all things concerning your health, though, moderation is in order.

A logical question here is, "how do I get these nutritious foods whilst out in the system? After all, a PBJ (peanut butter and jelly) snack is loaded with goodies but doesn't usually come with a salad bar!" Well, for those of you transiting Scott AFB, you can relax. They have a "fix" for the problem.

Beginning last September, the Scott inflight kitchen began including relish packs in all snack and sandwich meals. The relish packs contain carrot and celery strips as well as olives, which are just the things to get you through those inflight attacks of the "hungries." If the inflight kitchen at your base hasn't picked up on the relish pack idea, suggest that they do. After all, it's your health.

Why carrots? Everybody knows they taste better than parsnips!

C.R. TERROR

The Hirsute Honcho flips his wig

Okay, Major. You can open your eyes now. My masterpiece is complete." The rumpled owner of the establishment, Gene "Buzz Job" Skalpem, handed the Portly Patron a hand mirror and stepped back to watch the reaction.

Slowly, ever so slowly, the Trembling Titan raised his eyes to the large mirror in front of him. Suddenly, and to everyone's surprise, he launched himself out of the chair. "Whoopee! I can't believe it. Why didn't I think of this sooner? Is it really me?"

"Yep, it's really you, C.R.," interjected the delighted barber, founder and sole stylist of Jolly Gene's Clip Job, Hair Restoration and Rug Shop. "What do you think, Francette?"

Cracking her double fruit gum and peering through her oversized glasses, the curly-haired manicurist did a perfect double take. "Wow, C.R.! You look 20 years younger. Far out!" She resumed filing her already razor-sharp fingernails as C.R. Terror, once again the Hirsute Honcho, beamed.

"Gene, m'lad, I just don't know how to thank you. Why

this rug...er, hairpiece looks as real as my very own hair. You even got it to swirl just like my hair used to—when I had some, that is." C.R. ran his fingers gingerly through his curls. "Tassels just won't believe it."

Actually, Tassels screamed! Partly out of surprise and partly out of a *strong* desire not to laugh in the face of the Bewigged Buffoon. Quickly recovering, though, she stared at C.R. and his curly locks. "Looks real good, C.R.," she finally stammered. "Sorry I screamed, but you just surprised me. Why didn't you warn me you were going to stop washing all that forehead and start combing it?" Tassels stuck out a shapely hand and gave C.R.'s hairpiece a tentative pat. Both jumped, however, when the hairpiece neatly rotated about 30° to the left.

"I told ol' Gene that he needed more glue," C.R. blustered as he reached into his jacket pocket and extracted a tube of ACME Combination Hairpiece Glue and Gasket Cement. "I'll be back as soon as I get this beautiful head of hair properly restrained," he cheerfully informed Tassels as he rushed into her powder room, glue in hand.

Alone at last, Tassels covered her face with a soft pillow and laughed until she cried. How could she tell the Legendary Lothario that his hairpiece was at least two shades darker than his meager natural hair and that it looked like a leftover from a kid's Halloween costume?

It was at exactly 0500 the next day that C.R. vaulted

out of bed and began dressing in preparation for his CT-39 mission later that morning. Showered and shaved, he gently lifted his beloved hairpiece from its styrofoam support and prepared to once again cover his oversized bald spot. Liberally applying the hairpiece glue to his head, he squirted on a large dose of super glue, just to make sure the hairpiece stayed put. Minutes later, he finished combing his hair for the fourth time, and stepped back to admire himself. "Boy, that ought to impress the boys on the lieutenant colonels' board," he muttered. "Makes me look so young I should be below-the-zone material."

Noting the time, he quickly donned his new blue flight coveralls and headed to his trusty green Jag for the trip to the base. "Told Sammy I'd meet him at base ops at 0730, so I'd better hurry," he said, conversing with himself. "I'll bet he won't even recognize me."

"Morning Boss," Sammy managed to croak before he turned away from the Fur-topped Flyboy in a futile attempt to regain his composure. "Er...ah... I got the flight plan all done and filed us for a 0930 takeoff...if that's OK with you...ah Boss?" The Competent Copilot literally tossed the flight plan at the Befuddled Major and dashed off to the latrine. Soon the unmistakable sounds of uproarious laughter echoed throughout the building.

Ignoring the strange antics of his second-in-command, the Perplexed Pilot signed the flight plan and handed it to the red-faced base ops dispatcher. As he pocketed his copy, the Moody Major turned back to the quivering civilian behind the desk. "Why is everybody acting so strange this morning? You'd think I'd forgotten my pants." Feigning a severe coughing spell, the dispatcher turned away from the Agitated

Aviator and gave a universally understood shrug of his shoulders. He was unable to talk.

"Bus is here, Boss, " Sammy called across the room. "I've already got our bags loaded."

"Right you are there, copilot," the Sultan of SAAMs exclaimed as he headed for the bus. "Let's get a move on. We gotta be ready when our DV-3s arrive."

Soon the dynamic duo were busily at work readying their shiny Sabreliner for flight. Much to Sammy's disappointment, though, C.R. kept his flight cap firmly pulled down over his hair, frustrating the younger pilot's curiosity. Finally Sam could stand it no longer.

"Uh, Boss, I couldn't help but noticing. Is that...uh, a hairpiece you're wearing? I mean it looks real natural."

C.R. beamed with pride. "Glad you noticed, Sammy m'lad. It's the latest in tonsorial topwear from Jolly Gene's. He guarantees it for 15 years."

Nervously, Sammy continued. "Not to be a spoilsport Boss, but don't Air Force regs mention something about not wearing wigs or hairpieces during flight?" The faithful copilot was obviously concerned.

"Not to worry! Not to *worry!*" The Mop-Top Major quickly retorted. "Besides, Sammy, this 'piece of art' is carefully and thoroughly affixed to my trusty scalp. It wouldn't come off with a crowbar. Whoops, here come our DVs. Standard plan, Sammy . You do the grip and grin routine whilst I get the motors turning on our miniliner."

Realizing the absolute futility of continuing the discussion, Sammy bounded out of the right seat to greet the approaching DVs, while C.R. busied himself with the switches and gauges. After seating the DVs and their party, Sammy quickly returned to the cockpit and assisted the Muddled Major in completing the checklists.

Engines running and chocks removed, the miniliner was ready for departure. It was at precisely that time, however, that C.R. noticed the fire bottle tucked under the left wing of the aircraft. "Copilot's aircraft," he barked, already halfway out of his seat. "I'm going to get our marshaller to move that fire bottle. All we need to do is taxi over it with a pair of four-stars on board."

For once, Sammy wholeheartedly agreed with the Maladroit Major and was relieved to hear the door open as C.R. exited the aircraft. Then it happened.

First came a series of ear piercing screams. "OH NO! MY HAIRPIECE! ARGH! NO!"

Then, in rapid succession, came the flash of the left engine's fire light and the unmistakeable rumble and shudder of a self-destructing engine. As usual, calm in any crisis, Sammy deftly T-handled the affected engine, called the fire department, shut down the other engine and the aircraft systems and supervised the evacuation of the now smoke-filled aircraft.

As Sammy emerged from the miniliner, he noticed C.R. sprawled on the concrete in a dead faint. Quickly, the conscientious copilot checked the motionless major's pulse and was relieved to find it strong and steady. Then it hit him! A panicked glance at the Feeble Flyboy's once-again bald head and at the hair-covered engine nacelle confirmed the worst!

The investigation of this fodded engine incident would be one of the hairiest in history.

Quick Stoppers

Independent Thrust Reverser

It was just another unexciting day in the local pattern for the crew of this particular Starlifter. Then the thrust reverser not-locked light "blinked," only to quickly go out. Approximately 2 minutes later, the crew noticed the aircraft's turn response was sluggish and the airspeed was decreasing. Simultaneously, the thrust reverser not-locked-and-extended light illuminated and the scanner reported the number 4 engine thrust reverser was fully extended! The crew decided enough was enough, declared an emergency, completed the thrust reverser open in flight checklist and made an uneventful landing.

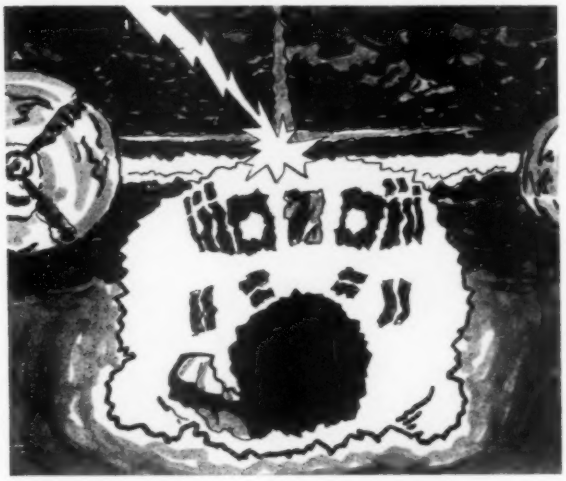
Maintenance investigation revealed problems with the thrust reverser control-valve stop lock. This made it possible for engine vibration to trigger the control valve, and thus to command an unwanted opening of the thrust reverser.

Sniff Check

During a routine FOD/panel inspection of an HH-1H, a maintenance technician was surprised to find the helicopter's battery was "warm." Another technician was called in and the battery voltage was checked and found to be normal. Since the battery was not due a 60-day capacity check for another 19 days and the tech data did not indicate this was a potential problem, the maintainers released the helicopter for flight.

Soon after, the HH-1H was airborne on a training mission. While flying a practice instrument approach, though, the crew noticed unidentified fumes and odors in the cockpit. The only abnormal indication was a higher-than-normal load on the main generator load/ammeter. Prudently, the crew initiated a precautionary landing to a nearby landing strip. During the descent, the fumes and odors increased and white smoke began pouring from the upper battery vent in the helicopter's nose compartment. After an uneventful landing, the crew quickly shut down the aircraft and egressed. They then noticed fluid dripping from the lower battery vents, and both the smoke and the dripping fluid continued until arrival of the local fire department some 15 minutes later.

Following removal and replacement of the faulty battery, the helicopter flew back to home base without incident. The failed battery was examined by battery shop personnel who discovered 6 of the 19 internal cells were destroyed for some unknown reason.



Static Strikes

The C-130E was operating in clouds and precip immediately after takeoff, in an area of high POLC (probability of lightning conditions). Our steely-eyed crew also just happened to be near the freezing level and near an area of thunderstorm activity. On climb-out, the crew noticed an external discharge, but didn't think it had struck the aircraft. Not so. The tacan antenna caught the full fury of the lightning strike which also burned the tacan diplexer and the associated circuit card. Again, proof positive that if you fly in these conditions, you'd best be prepared to suffer the consequences!

Knee Bends

The overseas Herk departed for a high altitude low opening (HALO) jump mission climbing to FL 250. After 44 minutes of prebreathing oxygen, one of the CCT jumpers, wearing a somewhat loose mask, noticed a tingling in his left knee. He attributed this to his cramped sitting position since he had earlier completed a PRICE check with no apparent discrepancies.

During freefall, the jumper's oxygen mask flailed about his face. The jumper's problems did not end after his safe landing, though. What had been a mere tingling earlier was now pain, both in his knee and in his left elbow. After treatment in a recompression chamber for "bends" and hospitalization overnight, the jumper was released with no further problems.

The subsequent investigation determined that the jumper's mask had leaked slightly during the climb to altitude, the prebreathing process, and the jump itself. The jumper, consequently, breathed a mixture of oxygen and ambient air which led to this "bending" experience.

In A Bind

Binding ailerons are hazardous to flight, but to experience that problem during the flare can be terrifying. Unfortunately, that's exactly what happened to the crew of an HC-130 recently. Just 25 feet above the runway, the AC discovered he couldn't turn the yoke left of center, although it turned to the right freely. Thanks to his skill and some good luck, though, the Herk made an uneventful landing and was turned over to maintenance, (enthusiastically, we'd guess).

The maintenance folks recorded the following corrective action: "Cleared aileron pack piston from heater duct fabric. Removed both left and right tubes. Manually operated rods. No binding. Connected and safetied. Opened panels on ailerons-no damage noted. Ops check OK."

With the problem seemingly cured, the aircraft continued with its mission, logging approximately 35 hours of flight time before returning to home station. But during the preflight for the next mission, the flight engineer discovered binding ailerons—again.

After an even more thorough checkout of the system, the maintainers found an aileron servo control-wheel stop screw installed backwards. After properly installing the errant screw, the aileron binding problem was fixed for good. Careful study of this incident revealed the design of the cable stops does not prevent improper installation of the screws. In fact, in some instances it makes backwards installation easier. Murphy is still alive and well!

High Altitude Hypoxia

It was to be a normal, run-of-the-mill high altitude, low opening (HALO) drop and everything went normally from the 30-minute prebreathing until the aircraft leveled at 25,000 feet. At that time, one of the jumpers appeared to have the symptoms of hypoxia. The crew declared an emergency, the jumper was reconnected to 100 percent oxygen and the aircraft quickly recovered to home plate. The hypoxic HALOer was treated by the flight surgeon and released.

The cause of the hypoxia was traced to the jumper's CRU-60/P connector which had become disconnected from the 12P mask hose. Had the jumper had a flow indicator on his regulator, which this particular regulator doesn't have, chances are he would have noticed the "no flow" condition and reaccomplished the old PRICE check.

Notable Quote

He only is exempt from failures who makes no efforts.

Richard Whitley

After Deadlines

C-141 AND C-130 STATION KEEPING EQUIPMENT (SKE) MODIFICATIONS—Prototyping of the C-141 modernized SKE modification began 14 November 1983 and subsequent ground and flight testing mod began in early December. Currently 62 C-141s have the APN-169B and all C-130E/Hs have the APN-169A SKE installed. The original 62 SKE-equipped C-141s and 80 other Starlifters will be retrofitted/equipped with the enhanced SKE. Field teams at McChord AFB, Wash., Norton AFB, Calif., Charleston AFB, S.C., and McGuire AFB, N.J., will install the enhanced SKE system on 80 non-SKE equipped C-141s between May 1984-March 1985. The 62 C-141s presently equipped with SKE will be retrofitted during February-July 1985. The C-130 modification effort is scheduled for May 1985 to August 1988 with 51 AWADS C-130s being retrofitted first. Information courtesy: HQ MAC/LGMA.

AIRCRAFT FIRE INCIDENTS—In 1983 MAC fire departments responded to hundreds of inflight aircraft emergencies and to 10 reportable aircraft incidents where fire was involved. The MAC fire department crews extinguished 7 of the 10 fires. Of the remaining three aircraft incidents, MAC fire crews assisted the Germans in fighting an air show incident fire; maintenance ground crews extinguished another fire; and one fire extinguished itself before fire crews arrived. *TMF* salutes all MAC fire crews for the superlative fire protection they provide to MAC aircrews and MAC assets. Information courtesy: MAC/DEMF.

MILITARY EDITOR VACANCIES FOR *The MAC Flyer*— We have an immediate opening and an opening in May-June 1984 for Associate Editors for MAC's flight safety journal. We need company grade pilots or navigators with MAC flying experience. Ambition and ability to tell a good story are strong qualifications for these positions. Flight safety and/or public affairs experience a plus. Interested officers should contact Major Jim Lee, Supervising Editor, Autovon 638-3534, or write to HQ MAC/IGFE, Scott AFB, IL 62225.

BARBADOS BOUND—A C-130 from the 317th Tactical Airlift Wing at Pope AFB, N.C., takes off from Point Salines Airport in Grenada on 1 November 1983 with wounded Cuban prisoners for Barbados. Many MAC aircrews provided support throughout the Grenada rescue operation. (USAF photo by 1st Lt. Walter Thorp).

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MAIN BOOST PUMP FAILURE (HEART)

WARNING INDICATIONS

1. Smoke emitting from main intake.
2. Excessive gross weight.
3. Boost pressure high.

CAUTION

These indications are particularly significant if the airframe in question has high time or was manufactured by a company with a history of early main boost pump failure.

ACTION IN THE EVENT OF MAIN BOOST PUMP WARNING INDICATIONS

1. Contact your flight surgeon.
2. Avoid high stress maneuvers until cleared by your flight surgeon.
3. Consult weight and balance data for ideal operating gross weight (your flight surgeon has this data).
4. Avoid smoke entering the main intake.

WARNING

Smoke entering the main intake is abnormal operation. This can lead to failure of other systems in addition to the main boost pump.